

CLAIMS

What is claimed is:

1. A gear shaft comprising a tubular body defining an axially extending cavity, an outer surface having a first gear engagement area for rotatably supporting a gear and a passage extending from said cavity to said gear engagement area.
2. The gear shaft of claim 1 wherein said tubular body further includes a first open end and a second open end communicating with said cavity, said cavity extending between said first end and said second end.
3. The gear shaft of claim 2 wherein said tubular shaft further includes a second gear engagement area and a second passage extending from said cavity to said second gear engagement area.
4. The gear shaft of claim 1 wherein said outer surface further defines a recessed pocket in said first gear engagement area, said passage extending outwardly from said cavity to said recessed pocket.
5. The gear shaft of claim 4 wherein said recessed pocket includes a planar surface.
6. The gear shaft of claim 1 wherein said wherein said tubular body includes a first open end communicating with said cavity.

7. A differential assembly having a differential case rotatable about an axis, and a gear assembly being partially submerged in a lubrication fluid, said gear assembly comprising:

a pinion shaft secured to the differential case for rotation therewith, said pinion shaft including a first open end and a second open end configured to be submerged in the lubrication fluid as the differential case rotates, wherein said pinion shaft further includes an elongated cavity extending between said first and second ends, an outer surface and a passage extending between said elongated cavity and said outer surface, and wherein said elongated cavity receives the lubrication fluid as said ends are submerged during rotation, said received lubrication fluid passing from said elongated cavity outwardly through said passage.

8. The differential assembly of claim 7 wherein said outer surface includes a gear engagement area, said passage extending outwardly from said cavity to said gear engagement area and said gear assembly including a pinion gear rotatably supported by said gear engagement area of said pinion shaft and wherein the lubrication fluid passing through said passage forms a lubrication barrier between said gear engagement area and said pinion gears.

9. The differential assembly of claim 7 wherein said gear engagement area further includes a recessed pocket, said recessed pocket and said pinion gears defining a lubrication bath therebetween.

10. The differential assembly of claim 9 wherein as said pinion gears rotate about said pinion shaft, said pinion gears draw the lubrication fluid from said lubrication bath to create a lubrication barrier between said pinion shaft and said pinion gears.

11. A differential assembly comprising:
a differential case;
a pinion shaft secured to said differential case for rotation therewith;
a set of spaced apart pinion gears rotatably supported by said pinion shaft; and
wherein said pinion shaft defines an elongated cavity, an outer surface, and a passage
extending from said elongated cavity to said outer surface.

12. The differential assembly of claim 11 wherein said outer surface includes a gear engagement area, said passage extending outwardly from said elongated cavity to said gear engagement area.

13. The differential assembly of claim 12 wherein said gear engagement area further includes a recessed pocket, said passage extending from said elongated cavity to said recessed pocket.